In a previous advanced homework you encountered the region bounded by $y = k$, $y = 2 - 2x^2$, and the $y$-axis, where $k$ is a positive constant smaller than 1.

In this problem, assume the shape is a metal plate with variable density $\rho = 4 - x$.

Set up an integral for the mass of the plate.

$$m = \int_{a}^{b} \rho \, dx$$

where the bounds of integration are

$a = \underline{ }$

$b = \underline{ }$

Do not evaluate your integral.
In a previous advanced homework you encountered the region bounded by $y = k$, $y = 2 - 2x^2$, and the $y$-axis, where $k$ is a positive constant smaller than 1.

In this problem, assume the shape is a metal plate with variable density $ho = y$.

Set up an integral for the mass of the plate.

$$m = \int_a^b \ldots$$

where the bounds of integration are

$$a = \ldots$$

$$b = \ldots$$

Do not evaluate your integral.
Consider the region that lies in the first quadrant bounded above by $y = 4 - x^2$ and bounded below by the $x$-axis as shown.

In this problem, assume the shape is a metal plate with variable density $\rho = \sqrt{4 - y}$

Find the line $y = b$ such that the mass above the line is equal to the mass below the line.

Give an exact answer.

$$b = \phantom{1}$$